BRIEF IN SUPPORT OF PETITION FOR WRIT OF CERTIORARI.

Before proceeding with discussion of the specific questions put in the foregoing petition, we think it advisable to present the subject matter of the patents in suit with an historical review of what led up to Dr. Steenbock's "truly remarkable conception in the then state of knowledge", to quote Judge Healy in his "concurring" opinion (R. 3343), and with a word as to public benefits that were conferred by that conception, and as to the manner in which the patents in suit have been administered by petitioner.

Introduction.

The three Steenbock patents in suit relate to a means for the cure and the prevention of rickets. The disease is a serious one, since it is an impeding of skeletal development. In rickets there is a poor utilization of the minerals calcium and phosphorus (R. 1301). Thus the bones cannot be normally formed (R. 1301). In man this disease occurs principally among infants before two years of age (R. 142, 1301). In humans this is the period of most rapid growth (R. 1301). The more rapidly bones are growing, the more likely is rickets to occur (R. 1301, 3111-12). The external deformities occasioned by the disease are sometimes appalling. Illustrations presented by Dr. Jeans, a pediatrician who serves widely, and who, among other responsibilities, acts as Special Consultant of the United States Public Health Service (R. 1296-1299), show some of the more extreme external manifestations of the disease (R. 2358-2359).

The disease of rickets has long been known. Dr. Glisson, in 1650, described most of the symptoms known today (R. 143). However, only recently has the cause of rickets been

demonstrated (R. 144). Beginning more than two centuries ago the Scandinavians used cod liver oil as a remedy. More than a century ago a German journal reported observations on the treatment of infants with cod liver oil and concluded that it was a specific for the prevention or cure of rickets (R. 144). However, as late as 1905 the American Medical Association's journal published an article by the Secretary to the Council on Pharmacy and Chemistry declaring that there was no evidence that the fats of cod liver oil possessed therapeutic qualities, and asserting that most pharmacologists believed that whatever virtue there was in cod liver oil depended on its qualities as an easily assimilable fat (R. 145). It was considered to be only a food (R. 144-145). Up to 1915 these views of the Council on Pharmacy and Chemistry had not much changed (R. 145).

Shortly after 1915, a number of studies developed important information in respect to rickets; but none of them, save his own, led to Dr. Steenbock's inventions. As the District Court found, there was no knowledge extant prior to Dr. Steenbock's discoveries that organic substances, deficient in Vitamin D, could be activated antirachitically by ultra violet light (R. 101-102).

It is now known that it is Vitamin D that functions in the body to aid in the assimilation of the minerals calcium and phosphorus in the diet, and thus build strong bones and teeth (R. 142-3, 1300-01, 1307). Dr. Steenbock did not discover this vitamin. He did make a vastly important contribution for the cure and prevention of rickets by producing in foods and medicines Vitamin D through the treatment of them by ultra violet rays for a period sufficient to effect antirachitic activation but so limited as to avoid subsequent substantial injury of the antirachitic principle. The First Steenbock Patent in suit relates to

this. The Second Steenbock Patent relates to an essence and to a concentrated antirachitic compound—comprising unsaponifiable lipoids* separated from a substance rich therein, activated with ultra violet rays—of particular importance for medicinal use in the cure and prevention of rickets. And the Third Patent is concerned with antirachitically activated yeast. These three patents are concisely described in the District Court's opinion (R. 60-66).

Dr. Steenbock was a pioneer. His contributions are pioneer inventions. The record abundantly supports this. There is no contrary evidence. The District Court was wholly correct in finding, after hearing and examining the great mass of evidence on the record, that (R. 102)

> "When Dr. Steenbock made the inventions of the three patents in suit he opened a new field, *founded a new art* and rendered possible the production of new sources of Vitamin D in the diet. Prior to the making of Dr. Steenbock's inventions the only recognized edible antirachitic substance was cod liver oil. Dr. Steenbock thus produced new results in providing in medicines and foods through the use of ultra violet rays, Vitamin D for the prevention and cure of rickets in mankind and animals."

That Dr. Steenbock was the founder of this new art; that he, and not some other seeker for better means to prevent and cure rickets, was the inventor, is understandable when the history of his work is known.

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*Edible fats and oils are spoken of collectively as fats by the chemist and differentiated only on the basis of whether they are solid or liquid at ordinary temperatures. When a fat is treated with an alkali, such as household lye, all except a small percentage is converted to soap. The remainder, the unsaponifiable fraction, can be extracted from the mixture by a solvent such as ether in which the soaps are insoluble. This fraction contains the "unsaponifiable lipoids" of the fat and is similar to fats in its physical properties but differs chemically. The composition of the unsaponifiable fraction is determined by the fat from which it is prepared (R. 187-9).

There were urging facts to spur any searcher. Nothwithstanding the capabilities of cod liver oil, and of ultra violet light directly applied to the bodies of children in the fight against rickets, rickets continued to be a highly prevalent disease among children, as was pointed out in the specification of the First Steenbock Patent, for which application was made June 30, 1924. Dr. Park, in an article (Def. Ex. E-18, R. 3069) published eight months before Dr. Steenbock's invention of the First Patent in suit, stated that:

> "One can say that rickets is so common in the large cities of America and Europe that few children among the poorer classes are untouched by it".

Dr. Steenbock's Background in Contrast With That of Other Investigators.

Dr. Steenbock studied in the College of Agriculture of the University of Wisconsin beginning in 1904. He graduated in 1908. He specialized in chemistry. From 1908 until 1912 he served as an assistant in Agricultural Chemistry at the University of Wisconsin. He taught and did research work along the line of animal nutrition. The problems with which he was connected dealt primarily with the utilization of inorganic elements by animals (R. 791). He did post-graduate work at Yale in 1912 (R. 792). There he specialized in Bio-Chemistry or Physiological Chemistry (R. 792). In 1916 he received his Doctor's degree at the University of Wisconsin (R. 792). Also, in 1913, he studied in natural science fields in Germany (R. 793-794). At Wisconsin he successively became instructor, assistant professor, associate professor, and full professor in the field of Agricultural Chemistry (R. 794-5). He was interested in the metabolism of animals (R. 794-5). The series of notebooks which he started in

1917 number several hundred (R. 803). His animal experiments and feeding tests recorded up until the filing of his first patent application, June 30, 1924, involved the use of approximately 5,000 animals (R. 804).

His interest in lime, or calcium, and in phosphorus in animal metabolism is shown in many published articles of record. Plaintiff's Exhibit 1, an article by Steenbock and Hart, received by the Journal of Biological Chemistry, January 4, 1913 (R. 1853), well illustrates some of his earlier work. Its first sentence reads—

> "A question which has baffled pathologists for a long time, and one which is not yet in a fair way of solution, is the cause of specific bone diseases known as rachitis, osteoporosis, and osteo-malacia, diseases which are all characterized by an impoverishment of the bones in inorganic substances."

This early interest in the nature of rachitis—or "rickets," as the disease is commonly called—discloses that Dr. Steenbock acquired a conception of it that was not had by other investigators. The doctors and investigators who saw rickets in children, with its gross deformities, and who gave their attention to the study of Vitamin A, which was known as early as 1913 and continued to be known as the "growth" vitamin, seemed not to have had the approach acquired by Dr. Steenbock—not only in respect to young, rapidly-growing animals, but also in respect to adult cows, pigs, goats and other animals of the farm. A very general idea of the nature of that work over several years can be obtained from the titles in the index in Volume I of the Record, pages V to XII.

Dr. Steenbock and his associates were not the only ones working upon rickets. In 1919, Dr. Mellanby, in England, conducted investigations on rickets in growing puppies. He found certain fats effective. Butter fat was usually

helpful, but not nearly so much so as cod liver oil (R. 145-146; the Mellanby Article, Def. Ex. E-2, R. 2936-38). He found most of the vegetable oils ineffective. The dogs that ran out of doors did not develop rickets. Findlay and Paton concluded that hygiene, exercise and fresh air were important in preventing rickets (R. 146, 2946-47). Huldschinsky, in Berlin, observed that rickets in infants could be cured by exposing them to the light of a quartz mercury vapor lamp (R. 146; Def. Ex. 3, R. 2955-58). Dr. Alfred Hess of New York had noted that rickets was more frequent in the late winter and early spring months (R. 146-47).

None of these investigators, or the many others, had the background of experience with animals, both young and old, that was Dr. Steenbock's. In their interest in Vitamin A, and their studies of growth as related to that one vitamin, the sound approach to the real cause of rickets escaped them. An illustration of futility is found in the work of Goldblatt and Soames as late as 1923 (Def. Ex. E-21; R. 3162-75). They did find a growth-promoting factor in rat livers taken from rats that had been skin irradiated in life. Their work went no farther than to again present the mystery found in the storage of what is now known to be Vitamin D in the liver of codfish. Their observations left it a mystery. It is still a mystery.

Another illustration is found in the work of Hume and Smith at about the same time. They also concerned themselves with growth as promoted by ingestion of Vitamin A. Their report makes no mention of rickets. What they undertook to demonstrate was that growth of rats fed on a diet deficient in fat-soluble vitamins (Vitamin A) would be promoted by inhalation of irradiated air. It was later proved that they were wrong, so that their publication (Def. Ex. E-20, R. 3149) contributed nothing whatever to

the solution of the rickets problem or even to the growth problem with which they were dealing. The whole subject was still shrouded in mystery, as Goldblatt and Soames left it.

In 1913 it had been found that certain fats contained substances necessary for the growth of experimental animals—such as the rat (R. 140). By 1914 Vitamin A had been found in cod liver oil (R. 140). In 1924 Steenbock and Nelson (and this was after the beginning of the particular experiments by Dr. Steenbock which on their conclusion suddenly illuminated the darkness with his important invention covered by the First Patent in suit) established that there were two distinct vitamins, A and D, in cod liver oil (R. 152). Goldblatt and Soames seemingly had not even suspected this. These investigators believed that the mystery related to the presence of Vitamin A in the liver of a living rat. Their observations respecting their experimental rats were concerned with growth alone. Growth was considered a condition for the production of rickets. Therefore, growth alone could not prove the absence of rickets. The aforesaid Goldblatt and Soames article concludes that

> "The correct explanation must await the results of further studies on the *nature of the fat-soluble growth-promoting factor* as well as on the *site and mode of its action*" (Def. Ex. E-21, R. 3174).

The action of artificially produced ultra violet light upon a live rat was no more the Steenbock discovery and teaching than was the known direct ultra violet light treatment of a child. It was not the discovery that an inert organic substance of dietary value could be directly irradiated by artificial means so as to potently acquire an antirachitic property, available for the prevention and the cure of rickets.

In fact, Dr. Steenbock back in 1913, though his final inventions were far in the future, was as near the inventions of his patents as were such investigators as Goldblatt and Soames in 1923, or as were Hume and Smith in that year. As early as 1913, in work in which Dr. Steenbock engaged with Professor Hart, is was found in connection with some experiments conducted with cows and goats relating to loss of lime with certain rations (R. 472):

> "After one of these experiments had been concluded with the demonstration that one particular goat was losing considerable quantities of lime from its skeleton, the animal was turned outside and allowed to run on pasture, and then it was brought back into the laboratory, and its lime balance studied as before. It was found that now the goat retained lime on exactly the same ration on which it had formerly lost lime, and it was surmised then that some agency which had been operative while the goat was out of doors had produced the change in result."

In 1918, Dr. Steenbock was doing research on Vitamin A. His inquiries concerned its occurrence, stability, separation and storage, and the relation of this to ophthalmia, an eye difficulty, and growth (R. 475-78).

About 1921 he returned to the studies that had earlier been made by him in respect to goats and cows, concerning the deposition and loss of mineral salts (R. 473). Up until this time (1921) the reports of others concerning the action of ultra violet light, and the study of rickets and vitamins, as far as disclosed by the record, present only this:

In 1910, Seiffert had sterilized milk (Def. Ex. E-1). In 1913, 1914 and 1915, others were sterilizing milk, as shown in Defendant's Exhibits D-1, D-2, D-3 and D-5 (R. 2875, 2883, 2895, 2903). In 1919, Huldschinsky, as shown by Defendant's Exhibit E-3 (R. 2955) was treating rickets in infants by direct irradiation with ultra violet light. In the

same year, Zilva, as shown by Defendant's Exhibits E-4 and E-8 (R. 2959, 2990) learned that ultra violet light destroyed the Vitamin A in butter, but did not destroy the Vitamin B of yeast or the Vitamin C of lemon juice. In that same year, Mellanby (to whom we have already referred) was doing his experiments on the feeding of oils to prevent rickets in dogs.

In 1921, Steenbock was working with cows on various rations. In some instances these rations included grass; in others hays cured in the sun, and also hays that had been cured under canvas to exclude the sun. In some instances the cows were given cod liver oil. As he testified (R. 473):

> "The results of these experiments were hardly consistent. It was found, for example, that grass in the ration improved or increased calcium retention. Timothy hay which had been cured out in the sun did not improve calcium retention. Alfalfa hay which had been cured out in the sunlight under canvas covers did improve calcium retention. And cod liver oil always improved calcium retention. So, as a result of these experiments, we could hardly come to any definite conclusion, except that hays were very variable in their effects."

This is one of the many illustrations that emphasize the inconsistencies in the observations made during the long searching period, and that may now be viewed in retrospect in the light of the revelations of the Steenbock inventions.

Others worked in this field. In 1922, Hess cured infantile rickets by using sunlight and the rays of the carbon arc on the patient. Also there were instances in which he cured rickets in rats by feeding them cod liver oil, and by exposing the rats to artificially produced ultra violet light and sunlight. This was the same year that Goldblatt and Soames did some work in respect to Vita-

min A—with no disclosures that relate to the Steenbock inventions (Def. Ex. E-17, R. 3057). In this year Miss Hume did certain work concerning Vitamin A (Def. Ex. E-16, R. 3043). In the same year, 1922 (Def. Ex. E-13), Drummond published on the Vitamin A in the unsaponifiable fraction of cod liver oil (R. 3028-41); and Zucker found an antirachitic factor in the unsaponifiable fraction of cod liver oil (Def. Ex. E-15; R. 3042-43). In the same year, Chick, as shown by Defendant's Exhibit E-11 (R. 3002) treated infantile rickets by sunlight and also by artificially produced ultra violet rays through direct application to the patient, and by the administration of cod liver oil. Also McCollum, as shown by Defendant's Exhibit E-10 (R. 3001), found that rats could be cured of rickets by cod liver oil which had been freed of its Vitamin A content.

In 1923, the only material appearing in the prior art of record not hereinbefore mentioned, was the work of Dr. Hess in respect to the wave lengths effective in the cure of rickets in rats by the direct application of ultra violet light (R. 3146). Early in that year the Park articles appeared (Def. Exs. E-18 and E-22; R. 3066, 3176), the last of which disclosed that cod liver oil increases the calcium and phosphorus content of the blood.

Looking at the whole story of the work of others than Steenbock, without the illumination of the disclosures of the Steenbock patents in suit, it is wholly without significance in showing or approaching any of the Steenbock inventions. It is eloquently significant that these many searchers did not find his rickets remedy. The District Court so found. The scientists of the world, by the disclosures of their own publications, so proclaim. They published accounts of their efforts. In all of these no scientist found,

or claimed to have found, what Steenbock discovered. Steenbock had before him, presumptively (and actually, in most cases, as the record shows), the reports of the work of others, as they had the reports of his work. Hume and Smith thought they had discovered merit in the activation of air. Steenbock, with the assistance of Dr. Nelson, tried this. It did not work (R. 2225). They tried the activation of screens and of the cages in which rats were kept. It did not work (R. 2240). Hume and Smith's publication led away from, instead of toward, the Steenbock result. But even before this, Dr. Steenbock, with the assistance of Dr. Black, started a line of experiments. There was in them little to confidently hope for. Steenbock had begun in 1908 in the general field of mineral retention in animals. It was now 1923. The experience of fifteen years of inquiry was with him. He had a concept of rickets that differed from that of others—not as to its effects; they were everywhere observable; but a concept as to its cause—and this was not simply the absence of calcium and phosphorus, but of *some agency that controlled their use in the making of bone tissue.* The agency was not a special intruder among the young, as it seems he alone fully realized, but one that somehow worked in adult goats, pigs and cows, as well as in young animals. How could it be created and captured, and made available for controlled administration?

No one else had the background of observation and experience possessed by Dr. Steenbock. It had been generally assumed that rickets did not occur in adult animals. He did not concur in that assumption; and thus he was to draw from his experience with older animals conclusions which others felt were not justified (R. 505, 540, 654-58).

In examining Dr. Steenbock's important work in 1923, it should be borne in mind that the concept of rickets seem-

ingly held by his contemporary investigators was one in which the presence of the disease was believed to require—(1) gross deformity; (2) histological or X-ray pictures of abnormal bone structure; (3) low ash content of bone; (4) low inorganic phosphorus in the blood; and (5) low phosphatase (enzyme) content of blood (R. 504-08). Steenbock's approach to the disease, and his concept of it, was in terms of the disease's mechanism, and not merely the usually-observed symptoms. Thus it was to be diagnosed by—(1) excessive loss of calcium from the body, which goes back to the using of the observations made in his studies with animals beginning in 1908, and the significance of which seems not to have been appreciated by others, notwithstanding the Steenbock publications; (2) the failure of growth in the young in the absence of a Vitamin A deficiency—and this due to the storage of Vitamin A in the animal body or the presence of Vitamin A in the ration consumed. This is brought forth in Dr. Steenbock's testimony (R. 505, 657-58, 732) and Dr. Black's testimony (R. 428-29). Also Dr. Steenbock established that in the adult animal there were operative the same factors effective in producing normal bone calcification, as in the infant, but that the manifestations most obvious to the eye were different in the infant from those in the adult, because of the pronounced resulting deformities; also that in the young, in spite of an ample intake of calcium and phosphorus in the diet, growth could not proceed without bone calcification; and further that both in the adult and in the young the same calcifying factor, which is now identified as Vitamin D, was necessary. Further, it is clear that Dr. Steenbock did not, like the English investigators, Hume and Smith, and Goldblatt and Soames, and those who worked with them, limit their conception of the growth factor to Vitamin A. To him came the thought that when Vitamin A was sufficiently supplied, growth, with its con-

comitant, to-wit; increased calcification, could be used with his experimental rations as an index of the amount of Vitamin D present (R. 730-34).

The work of Dr. Steenbock appearing in the publication by him, Sell and Jones, Plaintiff's Exhibit 18 (R. 2058-65) in respect to the different amounts of growth induced by various kind of millets, not attributable entirely to differences in Vitamin A content, was aided by Dr. Steenbock's work with Dr. Nelson in March, 1923, to which we have already referred (Pl. Ex. 19; R. 2097) showing that ultra violet light and cod liver oil, in which oil the Vitamin A had been destroyed by aeration, induced growth in rats identical in degree and much greater than that obtained on the basal ration.

The work of the English investigators, Hume and Smith, was work of confusion and of error, and misleading as far as Dr. Steenbock's ultimate discoveries are concerned. Dr. Steenbock's work can best be viewed in the light of what was said in *Aerovox Corp.* v. *Concourse Elec. Co.*, 65 Fed. (2d) 386, 388:

> "History is a safer guide than speculation after the event."

Advent of Dr. Steenbock's Inventions.

Dr. Steenbock's inventions of the three patents in suit were conceived and reduced to practice prior to June 30th, 1924, the filing date of Dr. Steenbock's first application for patent.

On November 2nd, 1923 was begun the first experiment upon the activation of a food substance—a ration containing hog millet, casein and salts (R. 343-366; Pl. Ex. 35, R. 2243-44). The experiment, completed December 31st, 1923, demonstrated that the ration, when irradiated, pos-

sessed growth promoting and calcifying properties (R. 346, 481). This experiment is the foundation for the broad, generic claims 1, 5 and 8 of the First Steenbock Patent in which inhere the broad invention of his new cure for rickets. It is this experiment of which Dr. Steenbock said to Dr. Black (R. 740):

"* * * you may think this is a *fool experiment.*"

The Patents in Suit.

Based upon the above and other experiments conducted from November 2nd, 1923 to June, 1924, Dr. Steenbock filed his first application for patent (R. 2549). In the original application he disclosed fully the broad invention relating to the antirachitic activation of organic substances of dietary value and also he disclosed fully the activation of unsaponifiable lipoidal extracts (R. 2561-66). At the insistence of the Patent Office, however, Dr. Steenbock was required to present, by a continuation-in-part application, the subject matter of the invention relating to the activation of unsaponifiable lipoidal extracts (R. 2612). This application eventuated into the Second Steenbock Patent (R. 2285). Inadvertently yeast was not mentioned specifically as an activatable substance in the original application, but it was so mentioned in the continuation-in-part application. Again by reason of Patent Office exactions, yeast was made the subject matter of another continuation-in-part application which in turn issued as the Third Steenbock Patent in suit (R. 2291).

The relationship between the three patents, and the fact that the inventions of each were made prior to the filing of the original application for the first one, establish the correctness of the ruling of the Supreme Court of the District of Columbia in decreeing the issuance of the Second Steenbock Patent, of the Board of Appeals of the

Patent Office in causing the issuance of the Third Steenbock Patent and of the District Court in finding all three patents valid (R. 108, 2660, 2727).

The specifications of the patents in suit fully inform those skilled in the art exactly of what the inventions consist and how they are to be practiced. Those skilled in the art had no difficulty practicing the inventions of the three patents and certainly respondents have had no such difficulty (R. 2349-52).

The patents in suit do not claim anything broader than Dr. Steenbock's inventions. The invention of the First Patent is pioneer and generic in character and those of the Second and Third Patents are for separate inventions constituting species of the genus. The claims in all three patents are properly commensurate with the basic discovery or invention which Dr. Steenbock made and the various species thereof. The claims are definite and clearly define the scope of the three inventions, having regard to the breadth and nature of the primary invention.

Public Benefits.

The public benefits conferred by Dr. Steenbock's invention are many. Dr. Jeans, Professor of Pediatrics at the University of Iowa (R. 1297), Referee for the Council of Foods and Nutrition of A. M. A. (R. 1298), made clear the necessity for good utilization of calcium and phosphorus to promote good growth, and to prevent tooth decay, rickets and general muscular weakness (R. 1300-02, 1311-19). He made clear that infantile rickets is caused almost entirely by Vitamin D deficiency, and stated that Vitamin D may be synthesized when the skin is exposed to sunlight. He pointed out that sunshine is wholly inadequate (R. 1307); that smoke, clouds, dust and latitude are

responsible for reducing the effectiveness of sunshine (R. 1306). In the winter time, in temperate zones, the sunshine is wholly inadequate, even in the absence of smoke, clouds and dust. The amount of Vitamin D in the diet is little. Some small bit is found in cow's milk, egg yolk, and in other foods; but, when they are put together, it is rather unimportant in relation to the needs of the infant and child (R. 1307). He said that they are commonly disregarded by the physician to the point where he depends exclusively upon supplemental sources of Vitamin D (R. 1307)—such as cod liver oil and irradiated products, ergosterol, milk and yeast. In late years there has been a gradual reduction in the incidence of rickets. At the present day he has observed no active rickets in his practice (R. 1314). He found it necessary to go back to some of his early studies to find illustrative photographs of rachitic children—to some of which we have already called attention (Pl. Exs. 87-90, R. 2358-61). Sunshine has not been a factor in this reduction (R. 1316). He pointed out that until 1930 cod liver oil was the source of Vitamin D most extensively used. Because of the objection to the taste of cod liver oil, and for other reasons, the use of other materials has been increased, including irradiated ergosterol and irradiated fresh and irradiated evaporated milk, which products have played an important part in decreasing the amount of rickets and tetany; and that these products prevent rickets (R. 1317). Vitamin D milks have the advantage of automatic administration of Vitamin D. During pregnancy and lactation Vitamin D is necessary for the mother. Dr. Jeans also made it clear that Vitamin A, contrary to what many investigators prior to Dr. Steenbock's discovery believed, has no relationship to rickets (R. 1322).

The wide use of evaporated milk among children has been shown by the testimony of Nardin (R. 1341-42). It

was also shown that in 1940, 53% of all evaporated milk produced in the United States was irradiated with ultra violet rays to increase its content of Vitamin D (R. 1353). It also appears that 50% of artificially-fed infants are fed on evaporated milk. The number of deaths from rickets—which was .6 per 100,000 of population in 1921, decreased to .1 per 100,000 in 1939. The Steenbock inventions have greatly contributed to this.

The public benefits from Dr. Steenbock's inventions have not been confined to their material aid in the elimination of the malady, rickets. The public has likewise benefited because these patents are not used for private gain (Pl. Ex. 83, R. 2338). They have been soundly socialized. The royalties go to the petitioner, a corporation not for pecuniary profit, created to aid the University of Wisconsin in research in the fields of the natural sciences. They were given by Dr. Steenbock, the inventor, to this, the Wisconsin Alumni Research Foundation, which is conducted by a board of alumni, as set forth in the record (R. 1250-52).

Petitioner's Administration of the Patents in Suit.

In addition to this, petitioner, in the administration of the patents in suit, has for the protection of the public provided in its system of licenses a control over advertising claims made and over potencies of licensed products (R. 1466-68). Extensive laboratory analyses are made constantly upon licensed products to assure that the public is securing the benefits desired. Petitioner's control, far from constituting misue of the patents, protects the public from fraud, quackery and misrepresentation (R. 1275). The importance of this where the vitamin in question, Vitamin D, cannot be detected by the consumer through the senses of taste, smell, etc., cannot be gainsaid.

As to "dollars and cents" commercial success, which is of much lesser consequence than the actual human good accomplished, over 250 licensees in a variety of industries have accepted licenses under the patents in suit (Pl. Ex. 95, R. 1397). Petitioner has received from those licenses in excess of seven and a half million dollars in royalties, all of which, over and above expenses, is dedicated to the aid of scientific research at the University of Wisconsin (R. 1449).

Alleged Misuse of the Patents in Suit.

In its majority opinion the Court of Appeals discusses the question of whether it was against the public interest for petitioner to refuse the use of the inventions of the patents in suit for the irradiation of oleomargarine (R. 3312-13, 3317-22). Judge Healy at that time apparently did not approve of such discussion in the majority opinion, stating (R. 3341):

> "I think, though, that we should confine ourselves to the issues actually presented by counsel."

This question—i.e., whether petitioner should be denied relief because of its past refusal to license oleomargarine manufacturers under the patents in suit—was presented for the first time by the Court of Appeals in its opinion of November 24, 1944. The subject matter was not pleaded by respondents in their answer, except in its general pleading that petitioner cannot maintain the action and is entitled to no recovery because (R. 53)

> "plaintiff comes into court with unclean hands and is in an inequitable position."

The question was not argued either in the District Court or in the Court of Appeals, as the Court of Appeals recognizes in stating (R. 3318):

> "This raises the question, *not argued,* whether the effect on the public health of refusing to the users of oleomargarine, the butter of the poor, the right to have such food irradiated by the patented process is against the public interest."

There was no finding of fact or conclusion of law with reference to this alleged misuse of the patents in suit by the District Court, although other matters relating to alleged misuse were covered by the District Court's findings and conclusions, the District Court finding that there had been no such misuse (R. 107, 109).

The oleomargarine matter was not raised in respondents "Statement of Points" filed pursuant to paragraph 6 of Rule 19 of the Court of Appeals (R. 1823).

In view of the fact that the oleomargarine question was

> "one not properly raised, litigated or passed upon below"

(*McCullough* v. *Kammerer Corporation,* 89 Law Ed. 278), petitioner filed in the Court of Appeals a motion to remand the cause for the taking of further evidence with reference, among other matters, to the oleomargarine situation (R. 3415). An affidavit of one of the members of petitioner's Board of Trustees was filed in support of that motion (R. 3424). The Court of Appeals denied petitioner's motion to remand and wrote a further opinion (R. 3478). In this last opinion the Court of Appeals concluded that petitioner's refusal to permit the irradiation of oleomargarine (R. 3485)

> "warrants the refusal of the equitable injunctive and accounting relief sought by the corporation, though we hold the public interest is served better by our decision that the patents are invalid."

In petitioner's motion to remand filed in the Court of Appeals and in the affidavit filed in support thereof, petitioner set forth some of the reasons which prompted it not to offer licenses under the patents in suit to oleomargarine manufacturers (R. 3417, 3424-27). The moving papers also showed that long prior to the question being raised for the first time by the Court of Appeals in its opinion of November 24, 1944, petitioner had permitted and now permits the use of the inventions of the patents in suit for increasing the Vitamin D content of oleomargarine, although manufacturers of that product have had and now have little or no interest in licenses under the patents or in the use of Vitamin D in oleomargarine (R. 3424). However, by the denial of petitioner's motion to remand by the Court of Appeals, petitioner was not permitted to fully develop evidence relating to oleomargarine. Consequently the matter is presented to this Court on an incomplete record.

Regardless of whether or not petitioner was justified in not offering licenses to oleomargarine manufacturers—i.e., regardless of the reasonableness or unreasonableness of such policy,—the Court of Appeals, in its decision denying petitioner's motion to remand, has decided an important question of law in direct conflict with the decision of this Court in the *Paper Bag Patent Case* (*Continental Paper Bag Company* v. *Eastern Paper Bag Company,* 210 U. S. 405). In that case this Court laid down the principle that a patent is a property right and that a patent owner may, without losing his right to relief in equity, exclude others from *any* use or benefit from the invention whatsoever during the life of the patent. This Court there pointed out that in the patent statute (p. 423):

> "the language of complete monopoly has been employed,"

and quoted briefly from this Court's language in *United States* v. *Bell Telephone Company*, 167 U. S. 224, 250 as follows:

> "Counsel seem to argue that one who has made an invention and thereupon applies for a patent therefor, occupies, as it were, the position of a quasi-trustee for the public; that he is under a sort of moral obligation to see that the public acquires the right to the free use of that invention as soon as is conveniently possible. We dissent entirely from the thought thus urged. The inventor is one who has discovered something of value. *It is his absolute property.* He may withhold the knowledge of it from the public, and he may insist upon all the advantages and benefits which the statute promises to him who discloses to the public his invention."

In further discussing the rights of a patent owner, this Court further said in the *Paper Bag Patent Case* (p. 429):

> "As to the suggestion that competitors were excluded from the use of the new patent, we answer that *such exclusion may be said to have been of the very essence of the right conferred by the patent,* as it is the privilege of any owner of property to use or not use it, *without question of motive. Connolly* v. *Union Sewer Pipe Co.*, 184 U. S. 546."

In an earlier case, *Bement* v. *National Harrow Co.*, 186 U. S. 70, 90, this Court quoted with approval a Sixth Circuit Court of Appeals decision, *Heaton-Peninsular Button-Fastener Company* v. *Eureka Specialty Company*, 47 U. S. App. 146, 160, in which that court had said:

> "If he see fit, he may reserve to himself the exclusive use of his invention or discovery. If he will neither use his device nor permit others to use it, *he has but suppressed his own.* * * * A suppression can endure but for the life of the patent, and the disclosure he has made will enable all to enjoy the fruit

> of his genius. His title is exclusive, and so clearly within the constitutional provisions in respect of private property that *he is neither bound to use his discovery himself nor permit others to use it.*"

The most recent pronouncement of this Court on the subject of alleged suppression of patents is *Special Equipment Company* v. *Coe*, decided March 26, 1945. In that case this Court said:

> "This Court has consistently held that failure of the patentee to make use of a patented invention does not affect the validity of a patent. *Continental Paper Bag Co.* v. *Eastern Paper Bag Co.*, 210 U. S. 405; *Crown Co.* v. *Nye Tool Works*, 261 U. S. 24, 34; *Woodbridge* v. *U. S.*, 263 U. S. 50, 55; *Fox Film Corp.* v. *Doyal*, 286 U. S. 123, 127; *Hartford-Empire Co.* v. *U. S.*, 323 U. S. 386, 433."

It should be pointed out that the oleomargarine question, raised for the first time by the Court of Appeals in the majority opinion of November 24, 1944, is not a question of *complete* suppression of the use of the patent, or a question of *non-use*. The Steenbock inventions have been widely used in the food and drug industries contributing to the resultant almost complete eradication of the disease, rickets, as the record most completely shows.

The question posed by the Court of Appeals relates to petitioner's refusal to license in a very narrow and restricted field, to-wit: oleomargarine, in which field, had the Court of Appeals remanded for the taking of further evidence, the record would have demonstrated there was little or no demand for the use of the inventions of the patents in suit.

The decision of the Court of Appeals on the oleomargarine question is likewise in direct conflict with another recent pronouncement of this Court in *Hartford-Empire*

Company v. *United States*, 323 U. S. 386, decided January 8, 1945, and cited in the above quoted portion of this Court's opinion in *Special Equipment Company* v. *Coe*. In the *Hartford-Empire* case, this Court said:

> "A patent owner is not in the position of a quasi-trustee for the public or under any obligation to see that the public acquires the free right to use the invention. *He has no obligation* either to use it or *to grant its use to others.* If he discloses the invention in his application so that it will come into the public domain at the end of the 17 year period of exclusive right he has fulfilled the only obligation imposed by the statute. This has been settled doctrine since at least 1896. Congress has repeatedly been asked, and has refused, to change the statutory policy by imposing a forfeiture or by a provision for compulsory licensing if the patent is not used within a specified time."

In the majority opinion of the Court of Appeals in the case at bar, that Court recognized the earlier holdings of this Court above set forth when it said (R. 3320):

> "Suppression of the use of the property in a patent has often been held the right of the holder of the patent monopoly, * * *."

In deciding that petitioner's refusal to license oleomargarine manufacturers (R. 3485):

> "warrants the refusal of the equitable injunctive and accounting relief sought by the corporation,"

the Court of Appeals has decided an important question of law contrary to the previous and later decisions of this Court above referred to. We submit that that question should be decided by this Court, and this petition for the writ of certiorari should, therefore, be granted.

Scope of Claims in Suit—Whether Broad Enough to Include Sunlight or Limited to Artificial Light.

The majority opinion of the Court of Appeals interprets claims 1, 2, 3 and 8 of the First Patent as being broad enough to include solar irradiation and finds these claims invalid for anticipation "by immemorial agricultural and horticultural processess" (R. 3322). Judge Healy disagrees, stating (R. 3341-2):

> "Further, it appears to me doubtful that the claims are fairly subject to the criticism that they broadly include a monopoly of the use of sunlight."

In this we think he is supported by the definite disclaimer of sunlight in the specification of the First Patent, and by what transpired in the prosecution of the application for that patent as we shall presently point out.

With respect to the interpretation of claims in the majority opinion as comprehending sunlight irradiation, it would appear to have been overlooked that the Patent Office allowed the claims of the First Patent as claims limited to *artificially* produced ultra violet rays. Thus in his action upon the amendment which introduced these claims, the Examiner rejected claims 6 to 9 upon authority of *Cochrane* v. *Badische Aniline,* 111 U. S. 293, stating (R. 2586):

> "Antirachitic food substances being old as occurring in nature, applicant has not defined a patentably new composition of matter by defining food substances *artificially made antirachitic by a specific process.*"

Each of these product claims was made dependent upon process claim 1, from which it becomes clear that this claim (now claim 1 of the First Patent) was treated by the Patent Office as being for a process of *artificially* imparting antirachitic properties to organic substances of dietary value, and not as the majority opinion treats that claim.

We submit that the claims in suit of the First Patent should stand *as the Patent Office interpreted them,* rather than that they should be taken in broader scope simply because petitioner *had* at one time asserted the First Patent against solar irradiation, especially since the practice then charged to infringe involved the *concentration* of the sun's rays by *artificial means* (R. 3420, 3427, 3433).

Neither should the inventor's testimony which is quoted in the majority opinion be given effect to put a different interpretation upon his claims from that put upon them by the Patent Office when allowing them to him.

With respect to the disclaimer of sunlight in the specification of the First Patent, the *first* appearance of anything of this character was not in the amendment which introduced the claim quoted in the opinion and which specifically read "artificially produced rays". The specification as originally filed contained the following statement (R. 2560):

> "Sunlight, of course, contains the rays of the ultra violet region, as well as other rays. However, *under ordinary conditions, the sunlight is not given an opportunity to affect various food products in such manner as to activate them antirachitically.* Probably the chief difficulty is that the sunlight is *not sufficiently rich in the rays of the ultra violet* character, or these rays are *not sufficiently concentrated,* to perform the required activation which is necessary to supply an antirachitic food. *Under special conditions, sunlight may be employed to improve the condition of foods, but ordinarily the use of an artificial light, rich in the rays of the ultra violet region of the spectrum, will be necessary* for practical purposes.
>
> "The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art."

The claims that were *originally* filed were *not limited to artificially produced rays.* We think it is significant that the *much more definite disclaimer* which was substituted by the amendment introducing the claim quoted in the majority opinion (R. 3327), was *retained when the later amendment was made substituting claims of the patent* for those which had been introduced by the preceding amendment and had been rejected, or objected to, on various grounds (R. 2578-9).

We direct attention to other testimony of Dr. Steenbock than that quoted in the majority opinion where he gives reasons why sunlight "is not available practically for the production of the antirachitic principle", and why "Artificial light rich in the rays of the ultraviolet region of the spectrum is *necessary.*" On pretrial adverse examination he was questioned concerning sunlight experiments and testified (R. 537):

> "The reason that we did not attach much importance to these irradiation experiments was that sunlight was so variable and so difficult to use, so we didn't consider it practical."

He later testified that, as shown by the wide prevalence of rickets in children and animals (R. 617):

> "* * * the sun was not efficient, was not doing the job, and there was need for the use of *artificial sources* of ultra violet for the purpose."

Dr. Nelson similarly testified at trial. Thus on cross examination he was asked (R. 269):

> "What is meant by the statement that sunlight is not available practically for producing the antirachitic principle?"

and answered,

"If you wanted to produce vitamin D under commercial conditions, let us say, *you couldn't depend on the sun to uniformly provide you with ultra violet rays of sufficient intensity* that you could carry on such a process continuously."

He likewise testified (R. 271):

"Q. Isn't the statement that sunlight is not available practically for the production of the antirachitic principle an incorrect statement?

"A. No; *I would not say it was incorrect.*

"Q. Isn't the sunlight available for producing the antirachitic factor in many things?

"A. My best answer to that is that *I don't know of any commercial product now on the market that contains vitamin D and that is offered for sale as such, because of its vitamin D content, that has been activated by the sun. Under those circumstances, I just don't believe it is a practical proposition.*"

Later on in the cross-examination he testified (R. 272):

"It is only under very unusual and very limited circumstances that you could say that sunlight is available for the practical production of the antirachtic principle."

His attention was then called to the sentence of the specification reading,

"Artificial light rich in the rays of the ultra violet region of the spectrum is *necessary.*"

and he testified (R. 272):

"Q. Will you refer now to page 4, lines 77 and 78? Do you understand from this statement that, according to the teachings of this patent, artificial light is necessary to produce vitamin D?

"A. For the practical production of vitamin D, I would say. That is the way I read those sentences. I read the two together.

"Q. You have to qualify that by using the word 'practical'?

"A. Yes; I think you have to read that sentence and its context and that follows immediately the sentence before which states that sunlight, of course, contains ultra violet rays but is not available practically for the production of the antirachitic principle. Then it says, 'Artificial light rich in the rays of the ultra violet region of the spectrum is necessary.' *I think for the practical application of the process it is necessary to use an artificial source of ultra violet rays.*"

In the majority opinion, the Court of Appeals stated (R. 3323):

"The sun is an 'other source of light [which] may be employed in effecting the activation' of vitamin D. The ultra violet rays of the sun are 'such as' produced by the lamp."

Compare this with Dr. Nelson's testimony regarding the meaning of the expression in the patent "or other source of light." He testified (R. 289-290):

"Q. Do you think that it refers to the sun as a source of light?

"A. *No;* not when you read that as a part of that whole sentence.

"Q. When you read that as a part of Dr. Steenbock's statement that artificial light is necessary, under those circumstances would you say that that refers to the sun?

"A. I would expect this to refer to sources of light that provided ultra violet rays of *considerable intensity.*

"Q. Why would you reach that conclusion, Doctor?

"A. Because of the other sources of light mentioned.

"Q. Would you take it that he referred to other sources of light like those he had mentioned above, that is, like the quartz mercury vapor lamp and the carbon arc?

"A. *I don't believe it refers specifically to sunlight* because it is well known that you get ultra violet rays from the sun and, *if those rays were effective for the purpose, I think it would have been mentioned in here. Therefore, I think it probably refers to these sources of light that are a little more intense.*

"Q. In other words, you think that the patent would mention those sources which were effective for producing the antirachitic factor?

"A. As I say, if sunlight, concerning which it is common knowledge that it is a source of ultra violet rays, were particularly effective, I think it would have been mentioned."

The foregoing supports what is found in the first paragraph of Judge Healy's "concurring" opinion where it reads (R. 3341-2):

"* * * it appears to me doubtful that the claims are fairly subject to the criticism that they broadly include a monopoly of the use of sunlight."

We submit that the Patent Office record itself puts the claims beyond any such criticism so that the disclaimer in the specification of the patent should be given full effect. The characterization of the statement "not available practically", as "ambiguous" in the majority opinion does not dispose of the immediately following statement in the specification:

"Artificial light rich in the rays of the ultra violet region of the spectrum is *necessary.*"

Here there is no such qualification respecting "special conditions" of sunlight irradiation as stated in the application *as filed* (R. 2560).

If, as we respectfully urge, the claims of the First Patent do not cover sunlight, then there is no anticipation of these claims by "immemorial agricultural and horticultural processes", as found in the majority opinion (R. 3322), nor is there anticipation of these claims by "the farmer in hay curing in the sun and the coconut grower sun drying the cut meat of the coconut" (majority opinion, R. 3330).

Judge Healy's opinion is only "concurring" in part, for, and as we have already pointed out, he disagrees with the majority opinion as to claims 1, 2, 3 and 8 of the First Patent being inclusive of "a monopoly of the use of sunlight" (R. 3342). Somewhat inconsistently, it seems to us, he concludes his opinion as follows (R. 3346):

> "If the discovery were patentable it would be broader than the process itself in that it 'would cover all processes which aim at the same result', including even the purposeful exposure of dietary substances to the direct rays of the sun."

However, this may, we suppose, be taken as a sort of corollary to the statement at an earlier point in his opinion (R. 3345): "The intervention of the mercury vapour lamp —developed long prior to Steenbock—may adapt the natural process to wider fields, but in a patentable sense the process itself is as ancient as the sun."

But this again seems inconsistent with what precedes in the opinion with respect to ultra violet rays, reading (R. 3345):

> "Men may devise or improve machines for their more effective utilization and may obtain patents upon the machine or the improvement."

This sound statement is equally applicable to *processes* and *their* improvement, and certainly Dr. Steenbock's process improved upon sunlight irradiation not alone in adapting it "to wider fields", as the opinion recognizes, but in attaining practicality and control whereby "purposeful exposure of dietary substance" to ultra violet rays has resulted in untold benefit to mankind and to animal husbandry, infinitely transcending anything capable of accomplishment in solar irradiation.

As admirably put by Judge Goodman in *Vegetable Oil Products Co.* v. *Dorward & Sons Co.*, 60 U. S. P. Q. 4, 7, D. C. N. D. California:

> "Some contention is made by defendants that this process is nothing more or less than a law of natural science and therefore is not patentable. True, the process makes use of and applies laws of natural science. Processes applying the laws of nature or of the natural sciences have always been considered subject to patent. *Sewall* v. *Jones*, 91 U. S. 171. Behr did not discover a 'scientific certitude'; rather as a result of a 'scientific certitude', he formulated a novel process."
>
> * * * * * *
>
> "True, much experimentation and investigation in the general subject matter had been going on for many years. Some of the steps described in the Behr patent had been theretofore discovered. Many experiments had been made and considerable literature written upon the subject. However, up to the time of Behr, no one had aggregated the necessary steps into a process possessing a new utilitarian function."

Judge Healy was certainly justified, upon the record in the instant case, in saying as he did in his "concurring" opinion (R. 3342):

> "I do not doubt that Professor Steenbock is to be accounted a pioneer in his special field, namely, the *artificial* activation of vitamin D in foods."

We submit that his patents merit judicial consideration in *that* spirit, rather than with a view to reading into an alleged anticipation subject matter not appearing therein and presenting nothing that did or could achieve the purpose of Dr. Steenbock's endeavors which so signally scored in the eradication of the age-old scourge of rickets.

"The Area of the Claimed Monopoly" is Not Indefinite.

The majority opinion of the Court of Appeals (Judges Denman and Stephens) held claims of the first two patents to be "invalid because of indefiniteness of the area of the claimed monopoly" (R. 3331).

Judge Healy dissented, stating (R. 3345),

> "It seems to me doubtful that the claims should be held invalid because lacking in particularity in respect of the period of time of exposure. It may be that they are sufficiently specific to enable those skilled in the art to understand what is intended. I assume, therefore, that Steenbock discovered and **sufficiently disclosed in his claims the most effective time period of exposure**".

He is supported in this by the fact that great numbers of industrial concerns operating in widely diversified fields sought and obtained licenses under these patents without any indication of uncertainty as to the "area of the claimed monopoly". Among them are such well-known concerns as E. I. duPont de Nemours & Co., The Quaker Oats Company, General Foods Corp., Parke Davis & Co., Standard Brands, Inc., Carnation Co., and E. R. Squibb & Sons.

The majority opinion, cites as authority for the holding of invalidity on grounds of indefiniteness, decisions of this

Court in *General Electric Co.* v. *Wabash Co.*, 304 U. S. 364, and *United Carbon Co.* v. *Binney Co.*, 317 U. S. 228. Neither of these cases is closely applicable because the invention claimed by Dr. Steenbock is very different in character from the inventions claimed in the patents that were before this Court in the cited cases.

In each of them the claims that were held to be invalid for indefiniteness were claims that purported to define a product *by its structural characteristics or physical form.* In the instant case the claims condemned in the majority opinion of the Court of Appeals for indefiniteness are claims for processes and resultant products that are *not structurally definable,* and so are defined by reference to the process of their production.

In the *Wabash* case the product claimed was a tungsten filament and the novelty lay in the structural character or physical form of the chain of grains or crystals making up the filament, whereby it was rendered non-sagging. The vice of the claims was their failure to define the structural characteristics which produced the non-sagging result,—the language being "of *such* size and contour as to prevent substantial sagging and offsetting during a normal or commercially useful life of such a lamp or other device". This the Court regarded as use of "conveniently functional language at the exact point of novelty".

No parallel to this is presented in the instant case. The claims in suit define a process of imparting the anti-rachitic property to organic substances of dietary value by subjecting them to the action of artificial light rays, specifically ultra violet rays, for a length of time which will insure the retention of the anti-rachitic property in substantial degree so that the resultant product can be used effectively in the prevention or cure of rickets. That product, not being definable by structural characteristics or physical

form, is defined in the product claims by specific reference to the process, i.e., the process as defined in precedent claims. This type of product claim is approved of in the *Wabash* case. Thus this Court there said (P. 373):

> "a claim may validly describe a new product with some reference to the method of production",

and the opinion concluded as follows (P. 374):

> "Finally, the product claims may not be saved by a limitation to products produced in accordance with the process set out in the specification. This construction, though possibly of no avail against respondent, might add to the protection afforded petitioner by the process claims, if they are valid, in view of its application to filaments produced abroad. But putting aside questions as to the general propriety of such a construction, *unless the claim uses language explicitly referring to the method of preparation,* or describing the product in phrases suggestive of that process, to save the product claim in this fashion would constitute an improper importation into the claim of a factor nowhere described there. The claims in suit seek to monopolize the product however created, and may not be reworded, in an effort to establish their validity, to cover only the products of the process described in the specification, or its equivalent."

The claims here in suit do not seek to monopolize the product however created but are expressly limited to a product produced by the process disclosed and made the subject of other claims to which express reference is made in the product claims.

The *United Carbon* case presented a situation akin to that presented in the *Wabash* case, the only claims in suit having been claims to a product without any reference to the process of production but solely to physical form or structural characteristics. The claims were held to be in-

valid because of not being sufficiently specific in defining the structural characteristics of the product, to wit, carbon black. The Court ruled that "the claims were but **inaccurate** suggestions of the functions of the product, and fall afoul of the rule that a patentee may not broaden his claims by describing the product in terms of **function**".

Again, as in the *Wabash* case, no parallel is presented between the subject matter with which the Court dealt in the *United Carbon* case, and the subject matter of the patents in suit in the instant case.

In concluding the opinion in the *United Carbon* case the Court made this pronouncement (P. 237):

> "An invention must be capable of accurate definition and it must be accurately defined, to be patentable."

We submit that a reading of the specifications of the Steenbock patents can leave no doubt as to his inventions being "capable of accurate definition" and having been "accurately defined". The evidence abundantly shows that those specifications contain everything needed to acquaint those skilled in the art with the particulars of the inventions and to adequately instruct them as to how the inventions are to be practiced.

The *record* shows that the Steenbock specifications were amply instructive to those skilled in the art. No *evidence* to the contrary was offered on defense. No one could be uncertain about infringement. The Steenbock discovery was heralded by the scientific world as epochal and there ensued clamour for licenses which would scarcely indicate "uncertainties of the monopoly area claimed" on the part of interested industries.

Certainly it is true that the record shows no instance of anyone having had real difficulty in avoiding "substantial injury to the antirachitic factor" and thereby being uncer-

tain in regard to infringement. In respect to the operations of petitioner's licensees, Dr. Steenbock testified (R. 701):

> *"But none of them had any trouble in carrying out the operations satisfactorily. We did not have to carry out any of these experiments for them."*

Similarly, respondents have apparently had no trouble at all in avoiding "substantial injury to the antirachitic factor."

Admittedly in order to avoid "substantial injury to the antirachitic factor," certain factors must be controlled, such as time of treatment, distance of light from the material being treated, intensity of the rays, state of comminution of the material, agitation of the material when in solution, etc. But, as Dr. Steenbock testified, the determination of these factors is a simple matter to those skilled in the art. He said (R. 699):

> "Q. And the determination of those particular factors are left to the person performing the process?
>
> "A. Yes, they are *quite obvious to those who are versed in chemical art.*
>
> "Q. Now, from the standpoint of time and distance, would it be obvious to the skilled technician to select suitable times and suitable distances for treatment?
>
> "A. He would have to carry out certain preliminary trials, but after getting certain results why *he wouldn't have any difficulty.*"

It thus appears that the terms "sufficient," "substantially maximum activation" and "substantial injury to the antirachitic factor" were informative enough to those skilled in the art not only to tell them how to use the process but also to advise them of the "monopoly area claimed."

The problem which Dr. Steenbock's patent solicitor had before him was not how to accurately *define* the inventions but how to *claim* them so that protection would be had commensurate with their generic nature.

The evidence shows that prior to applying for his First Patent Dr. Steenbock had ascertained by test that the time of exposure could be widely varied in achieving the result of endowing substances with the antirachitic property in substantial degree. The patents teach *that,* and those skilled in the art needed no more than the one specific example of practice of the new process which is given, and the instruction also contained in the specification as to how the time of exposure could be varied, as well as other variables of the process.

The majority opinion reflects difficulties imagined by the author concerning the "area of the claimed monopoly", none of which difficulties were encountered by any of the numerous industrial concerns that took licenses under the patents.

We submit that the "area of the claimed monopoly" is perfectly defined in the respect referred to, viz., the time of exposure, by the wording "for a period sufficient to effect anti-rachitic activation but so limited as to avoid subsequent substantial injury of the antirachitic principle". This quite definitely directs that the exposure be not continued to a point where, due to the destructive effects that accompany the imparting of the desired property, no substantial amount of it would be left.

The majority opinion seizes upon certain testimony of Dr. Steenbock as basis for academic discourse regarding economics as though demonstrating fatal "uncertainties of the monopoly area claim" (R. 3333-5). We say "academic" because this has no basis in realities revealed by the record.

Thus the record contains nothing indicative of any uncertainty on the part of any one of the multitude of business concerns which negotiated licenses to operate under the Steenbock patents. The notion voiced in the majority opinion that infringement is to be determined as between economic gain and economic loss cannot be justified.

In connection with this curious manner of dealing with the question of infringement it will be helpful to consider the phrasing of claim 1 of the First Patent as it read prior to its final amendment. The concluding clause read "for a period sufficient to effect antirachitic activation but so limited as to avoid subsequent *destruction* of the antirachitic principle or injury to palatability" (R. 2581). It is quite possible that "uncertainties of the monopoly area cleamed" might have arisen had the claim issued as so worded.

Expression of the time element was occasioned by citation of references disclosing *sterilizing* processes wherein substances of dietary value were subjected to the action of ultra violet rays emanating from a quartz mercury vapour lamp. Transitorily the antirachitic property would be imparted to the substance *but its destruction would result from continuing the exposure to accomplish sterilization,* or at least there would be diminution of the imparted antirachitic principle to an unsubstantial or inconsequential point. Therefore uncertainty might well have existed as to coverage of the claim, e.g., whether it was limited to endowing the substance with a *substantial* measure of antirachitic property or was so comprehensive as to possibly include a sterilization process.

Evidently appreciating this possibility the solicitor voluntarily amended the claim (R. 2590) to read as in the patent "for a period sufficient to effect antirachitic activation but so limited as to avoid subsequent *substantial injury* of the antirachitic principle",—in other words, so as to retain a

substantial measure of that principle,—one which would make the substance useful to achieve Dr. Steenbock's purpose of providing foods that would effectively work to prevent or to cure rickets. Thus the area of the monopoly claimed was defined with no such uncertainties as theorized in the majority opinion—indeed, an area well understood by all who desired to practice Dr. Steenbock's invention including the defendant in the case at bar.

This Court has delivered opinions in a number of cases which *are* applicable to the status of the claims in suit (as the decisions in *General Electric* v. *Wabash* and *United Carbon* v. *Binney* are *not*), because of dealing with patents on processing of materials where much variation would be practiced. A leading case is *Minerals Separation* v. *Hyde,* 242 U. S. 261. We quote a pertinent passage from the opinion (pp. 270-271):

> "Equally untenable is the claim that the patent is invalid for the reason that the evidence shows that when different ores are treated preliminary tests must be made to determine the amount of oil and the extent of agitation necessary in order to obtain the best results. Such variation of treatment must be within the scope of the claims, and the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-matter. The composition of ores varies infinitely, each one presenting its special problem, and it is obviously impossible to specify in a patent the precise treatment which would be most successful and economical in each case. The process is one for dealing with a large class of substances and the range of treatment within the terms of the claims, while leaving something to the skill of persons applying the invention, is clearly sufficiently definite to guide those skilled in the art to its successful application, as the evidence abundantly shows. This satisfies the law. *Mowry* v. *Whitney,* 14 Wall. 620; *Ives* v. *Hamilton,* 92 U. S. 426, and *Carnegie Steel Co.* v. *Cambria Iron Co.,* 185 U. S. 403, 436, 437."

In the there cited case of *Carnegie Steel Co.* v. *Cambria Iron Co.*, it was said (p. 437):

> "The specification of the patent is not addressed to lawyers, or even to the public generally, but to the manufacturers of steel, and any description which is sufficient to apprise them in the language of the art of the definite feature of the invention, and to serve as a warning to others of what the patent claims as a monopoly, is sufficiently definite to sustain the patent."

And further, same page:

> "We think this second claim not only describes with sufficient clearness the purpose of the patent to secure uniformity of the molten metal in its constituent parts preparatory to further treatment, but read with the specification *sufficiently* describes the process by which this uniformity may be secured, by always preserving in the reservoir a sufficient quantity of molten metal to secure such uniformity of product."

In *Smith* v. *Snow*, 294 U. S. 1, a process claim was sustained which read as follows:

> "1. The method of hatching a plurality of eggs by arranging them at different levels in a closed chamber having restricted openings of *sufficient* capacity for the escape of foul air without *undue* loss of moisture and applying a current of heated air, said current being created by means other than variations of temperature and of *sufficient* velocity to circulate, diffuse and maintain the air throughout the chamber at *substantially* the same temperature, whereby the air will be vitalized, the moisture conserved and the units of heat will be carried from the eggs in the more advanced stage of incubation to those in a less advanced stage for the purpose specified."

In the companion case, *Waxham* v. *Snow*, which follows in the same volume, page 7, a defense of functionality was overruled. And it is of interest to note that in *Buckeye*

Incubator Co. v. *Wolf*, the late Judge Westenhaver overruled a defense of indefiniteness.

We are reminded here of how the majority opinion in the instant case undertook to dispose of petitioner's contention that the *Wabash* and *United Carbon* cases were distinguishable because the patents with which they dealt "were for products rather than processes", the opinion stating (R. 3338):

> "There seems no distinction in principle between inadequate limitation of the monopoly area in such product and process claims."

But in an earlier opinion of the same Court in *Fullerton Walnut Growers Assoc.* v. *Anderson-Barngrover Mfg Co.*, 166 Fed. 443, the late Judge Gilbert, speaking for the Court, had said (p. 449):

> "A patent for a process is not to be held to the strictness of specification required in a patent for a composition, and the decisions holding void applications for patents of the latter class are not necessarily applicable to process patents."

This was preceded by the statement:

> "The inventor was not required to specify how the process could be most economically used. It was enough if he so described it that one skilled in the art could use it. It may be conceded that clearer information would have been afforded if the precise proportions of each solution had been indicated, but we are not prepared to say that for want of such precise information the patent should be held void."

The conclusion was expressed as follows:

> "We think that one skilled in the art of bleaching could, from the terms of the specification, without further information, make a compound solution such as would render the process practicable."

All of this has very definite application to the situation presented in the instant case.

The foregoing applies alike to the claims of the First and Second patents, the same definitive language being employed in each as to time of exposure. Since "indefiniteness" is the only ground upon which the Second Patent has been held to be invalid, we submit that certiorari should be granted for review respecting that patent in any event.

The Second Patent.

This patent is devoted to Dr. Steenbock's ancillary concept of a process involving separation from a parent substance of its activatable ingredient whereby to obtain a concentrated extract. The activatable ingredient consists of unsaponifiable lipoids and so the extract is defined in claims of this Second Patent as "an unsaponifiable lipoidal extract".

This has proved to be of very great benefit in dissemination of Dr. Steenbock's revolutionary remedy for prevention and cure of rickets. It is extensively used medicinally and also in antirachitically fortifying foods for both animal and human consumption.

Medicinally the concentrated extract is ideal both for packaging in convenient size and for dosage use. And in many fields the fortifying of food products by incorporation of the concentrated extract is far more practical and economical than irradiation of the food substances themselves. For example, stock and poultry ranchers practice fortifying feeds with activated ergosterol or 7-dehydrocholesterol, and flour mills and commercial bakers do the like. Thus they do not have to equip for irradiating their products, nor do purveyors of feeds, but simply buy the already activated extract which petitioner's licensees supply at

moderate cost. This is also the case as to various other products such as breakfast cereals, dry milk, fluid milk, evaporated milk, infant foods (such as Ovaltine, Cocomalt, etc.) and others. Products of the Second Patent—i.e. concentrates—also permit of raising the Vitamin D potency level of many such foods far beyond potencies that could be produced therein by direct treatment thereof with ultra violet rays—an important contribution of the Second Patent.

Claim 1 of this patent is phrased to comprehend practice of the process with irradiation of the lipoids either before or after their separation from the parent substance (R. 2287). But the commercial practice has been to first separate the lipoids and then irradiate them, to which practice claims 2 and 3 relate. By this practice antirachitic potency is obtainable greatly in excess of that resulting from irradiating the parent substance and then separating the lipoids, conditions of irradiation being the same (R. 688, 2287).

There is the further advantage that, as stated in the Second Patent (p. 2, l. 103), the irradiation can be "more prolonged" which means that the range of timing is increased while still retaining a substantial antirachitic property. See also Dr. Steenbock's testimony (R. 682).

The first Steenbock application contained a full disclosure of the separation process and claimed it and the product (R. 2561-2, 2564), but the Patent Office required confinement to claiming the generic invention and but one of the several disclosed species thereof. In the set of claims substituted for those originally filed there were still some to the separation process and product (R. 2573-5). The Patent Office again objected, dividing the claims into seven groups by species, and repeating the requirement that the claims be confined to genus and one species (R. 2579). This

was then done and within a few days the second application was filed as "in the nature of a division and continuation" of the first application (R. 2622).

Having driven the applicant to the expedient of filing this separate application, and others pertaining to different species, the Patent Office Examiner then refused to recognize patentability in any of them over what was claimed in the parent application (R. 2626). On appeal to the Board of Appeal the rejections were affirmed (R. 2655). The applicant then pursued his statutory remedy of a suit against the Commissioner of Patents in the Supreme Court of the District of Columbia. He prevailed as to the application for the Second Patent (R. 2660).

All of this consumed time which accounts for the term of the Second Patent running some four years beyond the term of the First Patent.

In the majority opinion first delivered by the Court of Appeals the Second Patent was held to be invalid on the same grounds as the First Patent,—anticipation by natural sun process and by prior publication,—that opinion reading (Appendix 7) "the same reasoning makes invalid the Second Patent." Upon petition for rehearing, that opinion was withdrawn, and the superseding opinion does not hold invalidity of the Second Patent on those grounds or either of them, but *solely on the ground of indefiniteness of claims,*— a defense not passed upon at all in the first opinion.

We have heretofore pointed out that Judge Healy of the Court of Appeals disagreed with the majority of the court in regard to the matter of alleged indefiniteness (R. 3345). He assumed (R. 3345):

> "* * * that Steenbock discovered and sufficiently disclosed in his claims the most effective time period of exposure."

Nevertheless, Judge Healy is wholly silent in his "concurring" opinion with respect to the validity of the Second Patent. Since he does not believe it to be invalid on the ground of indefiniteness, we think it may fairly be assumed that he regards the Second Patent as a valid one.

It is perfectly clear that the Second Patent was not anticipated, either by any natural sun process or by any prior publication. The sun never did any such thing as separating unsaponifiable lipoids from a parent substance, and no prior publication teaches any such thing or even hints at it.

There is no more indefiniteness about the Second Patent than there is about the First Patent. Claims of the Second Patent read the same as do claims of the First Patent as to time of exposure so that what we have hereinbefore presented on the subject of indefiniteness applies to them as well as to the claims of the First Patent.

Goldblatt and Soames Publication.

In respect to the prior published art, there is no anticipation of the claims in suit of the First Patent by the Goldblatt and Soames publication (R. 3162) which is given but scant attention in the majority opinion (R. 3329-30), and which is not even mentioned in the conclusion on the question of anticipation (R. 3330). Goldblatt and Soames irradiated *in vitro,* not *in vivo.* From the standpoint of anticipation, a live rat is clearly not an "organic substance of dietary value" within the meaning of claims 1 and 8 of the First Patent, or a "food substance" within the meaning of claim 5 of that patent.

Irradiation *in vitro* had been erroneously treated in the original (withdrawn) opinion as activating "the antirachitic substance in fatty flesh under the skin" there characterized as being "in a sense, stored food" (Appendix

3). The majority opinion asserted knowledge of such a thing as coming from Dr. Steenbock, whereas he had testified directly to the contrary (R. 610, 611). He there told of a test upon a live rat which proved "that the ultra violet radiations did not penetrate to the inner organs, not even the skin, not even through the skin, not to say anything about the muscle and the peritoneum, and so on."

Goldblatt and Soames certainly did not teach Steenbock's "truly remarkable conception". Judge Healy's "concurring" opinion, from which this quotation is taken, refers to these scientists as having practiced "the actual process of irradiating edible substances with the mercury vapour lamp". What Goldblatt and Soames actually did is not proven. We have only their published article so the one question is what *that* taught. Presumably the edible substance referred to is the liver but the evidence of record shows that *that* substance would not and could not be *irradiated* by their process. The process by which the liver in the living animal becomes antirachitic is unknown to this day.

At an earlier point the "concurring" opinion refers to the prior art of "irradiating living tissues" with mention of Huldschinsky's published work concerned with humans (R. 3342). Taking this to mean irradiation of skin tissues, and conceding that such a thing occurs, there is nothing of record to show that these tissues retained any antirachitic property so that they could constitute activated edible substances and so be used to reach Dr. Steenbock's objective. The evidence is to the contrary (R. 296-8).

Goldblatt and Soames taught little beyond what had been known for centuries in respect of the codfish. They did not advance the art one whit by way of teaching a preventative or cure of rickets in consumption of food as daily

habits of humans or animals, which was Dr. Steenbock's objective. Nobody ever heard of rat-liver oil and it is scarcely to be supposed that it would have been more acceptable than cod liver oil.

In view of what was already known about cod liver oil there could scarcely have been anything surprising in Goldblatt and Soames' results. The significant thing is that nobody of all the numerous scientists who were studying the subject of antirachitics thought of taking out livers and directly activating them, except Dr. Steenbock (R. 1720).

The real question is not anticipation of Steenbock by Goldblatt and Soames, but whether Steenbock made an *inventive* advance over their publication, which question is not essentially different from that of whether he made an inventive advance over nature's work with the codfish. The fact that centuries passed without any such advance being made by any of the numerous scientists who were in the field, speaks eloquently for inventive quality in Steenbock's conception.

Hume and Smith Publication.

As to anticipation by the Hume & Smith publication (R. 3149; referred to only in the concurring opinion and *not* found anticipating in the majority opinion), again there is no proof of actual accomplishment and so it is solely a question of what the publication taught. It taught error. The theory expounded was exploded. Their teachings did not advance the art at all. One may conjecture about just what could account for results such as recorded by them. The "concurring" opinion says that Dr. Steenbock (p. 25) "became **convinced** that the improvement in the condition of the rats was attributable, not to the irradiation of the air, but to the irradiation and consequent activation of the sawdust" (R. 3344).

This scarcely accords with the record. We quote a paragraph from a paper (Plaintiff's Exhibit 25, R. 2173, 2224) authored by Dr. Steenbock and one of his graduate student associates (the Dr. Nelson who testified at trial) which paper was received for publication November 13, 1924, some months after the filing of Dr. Steenbock's first application and about a year after his discovery had been made and practiced. The quoted paragraph refers to the Hume & Smith publication and reads as follows:

> "It is always a dangerous matter to attempt to interpret another investigator's findings, because in no case are all the conditions possibly bearing on the outcome of an experiment ever recorded, but, nevertheless, it suggested itself to the authors that Hume and Smith had overlooked the *possible* role of the sawdust with which their animals had been bedded. It is true that they report negative experiments where the irradiated air was blown out of the jars, in which the animals were kept, with a bellows, but unfortunately no mention is made of whether or not the sawdust was thereby removed. Furthermore, no mention is made by the English writers whether or not food and water were removed from the jars previous to irradiation. In view of results, published and unpublished, from this laboratory, this would be of import in evaluating their results."

This paper then refers to "initial experiments essentially according to the technique of Hume and Smith" but concerned with irradiation of screens upon which the rats were kept, and the statement is made at page 2227 "These experiments represented the first attempts to show that *possibly* the sawdust used as bedding for the animals was responsible in Hume and Smith's experiments for such positive results as they obtained."

These experiments were started *after* Dr. Steenbock had hit upon the idea of imparting antirachitic properties to

food substances by exposure to the ultra violet rays emanating from a quartz mercury vapour lamp, and when he assigned to one of his graduate student associates (Dr. Black who testified at trial) the work of practicing his conception, and to the other of his graduate student associates, Dr. Nelson, the work of running the experiments above referred to.

The record does not show that Dr. Steenbock or Dr. Nelson, upon reading the Hume & Smith article, understood it as teaching the presence of sawdust in the jars when they were put under the lamp. It all comes simply to this, that, having run a series of experiments to test out results of procedure such as Hume and Smith's article related, and getting no such results, it was concluded by Dr. Steenbock that, *if the sawdust was in the jars when under the lamp,* improvement in the condition of the rats when put back into the jars *might* be accounted for by their consumption of the irradiated sawdust.

This, we submit, is insufficient basis for taking the Hume and Smith article as *teaching* the irradiation of sawdust, and thus in effect accrediting *them* with the "truly remarkable conception in the then state of the art", which the concurring opinion attributes to Dr. Steenbock.

What was said years ago by the late Judge Shipman in *American Graphophone Co.* v. *Leeds, et al.* 87 F. 873, applies to Dr. Steenbock (p. 877):

> "Bell and Taintor made an actual, living invention which the public are able to use, and a court is not called upon to struggle to decipher an anticipation in the unfinished work and the surmises of earlier students of the same subject."

What was recently said by Judge Learned Hand, speaking for the Court of Appeals for the Second Circuit, in

Dewey & Almy Chemical Co. v. *Mimex Co.*, 124 Fed. 2d 986, is also in point (p. 989):

> "No doctrine of the patent law is better established than that a prior patent or other publication to be an anticipation must bear within its four corners adequate directions for the practice of the patent invalidated. If the earlier disclosure offers no more than a starting point for further experiments, if its teaching will sometimes succeed and sometimes fail, if it does not inform the art without more how to practice the new invention, it has not correspondingly enriched the store of common knowledge, and it is not an anticipation."

Certainly it cannot be said that either the Goldblatt and Soames publication or the Hume and Smith publication anticipates the Second Patent. Assuming, contrary to fact, that the Hume and Smith publication disclosed the antirachitic activation of sawdust, neither that substance nor the livers in Goldblatt and Soames's live rats were "unsaponifiable lipoidal extracts" within, for illustration, claim 3 of the Second Patent, nor did either of these groups of workers inadvertently, accidentally or otherwise teach or hint at the production of an "antirachitically activated substance in *concentrated* form", within the language of that same claim of the Second Patent.

The Third Patent.

The holding of invalidity by the Court of Appeals of claims 3 and 4 of the Third Patent, for laches, runs counter to the decision of this Court in *Overland Motor Co.* v. *Packard Motor Co.*, 274 U. S. 417, distinguishing from *Woodbridge* v. *U. S.*, 263 U. S. 50, cited and quoted in the majority opinion (R. 3340). The instant case is similarly distinguishable. See also *Crown Cork & Seal Co.* v. *Ferdinand Gutmann Co.*, 304 U. S. 159.

In *Overland* v. *Packard fourteen years* elapsed between the filing of an application disclosing and claiming the subject matter in controversy, and the issuance of a patent upon that subject matter as a division of an intervening application. Upon requirement for division of claims in the first application, the disclosure of and claims to said subject matter were cancelled and another application was filed, not as a division but including disclosure of and claims to the same subject matter.

After years of prosecution of the intervening application, one remaining and rejected claim to the subject matter in question was cancelled. There had been no requirement for division, but some months later a divisional application was filed devoted to that subject matter, and the patent in suit issued upon that application.

Here the delay in issuance of the Third Patent was largely due to exactions of Patent Office practice in the matter of allowable scope of applications. An attempt was made to patent yeast activation and the product through the application for the *First* Steenbock Patent. This failed for lack of disclosure (R. 2578). The rejection of the claims on the ground of "new matter" was accompanied by a requirement for division, and one of the several groups of claims specified, was made up of the *yeast* claims but no *divisional* application would have had standing upon *their* subject matter because of lack of disclosure thereof in the First application.

Neither would such claims as 3 and 4 in suit of the Third Patent have been permitted in the application for the Second Patent. In stating otherwise, the majority opinion overlooks the segregation of subjects matter by the Examiner's grouping of claims when acting upon the first amendment to the application for the First Patent (R. 2579). The lines of demarcation thus laid down re-

quired confinement of the parent application to one species, and the applicant chose glycerides. A separate application was filed as a division which application was devoted to the *separation* species—i. e., process of separating unsaponifiable lipoids from the parent substance. While there was included in this application a *disclosure* of yeast activation, the inclusion of *claims* to that, without any reference to the separation process, would *obviously have lead to another requirement for division.* The one claim to yeast that *was* included did have standing because it did relate to the separation species since it claimed a yeast tablet fortified by an activated lipoidal essence.

While Steenbock could have then filed still another application devoted to yeast activation, he did not have to do so and did not have to excuse delay in doing so. *Crown Cork & Seal Co.* v. *Ferdinand Gutmann Co.,* 304 U. S. 159[1].

If he needed an excuse it could be found in the difficulty he was encountering before the Patent Office with the four divisional applications which he did file[2]. Failing to convince the Patent Office that he was entitled to patents upon any of them, he was put to the necessity of filing suit against the Commissioner of Patents in the Supreme Court of the District of Columbia, in which he was successful as to two of the applications,—the one for cereal activation and the one upon which the Second Patent issued. Having thus at last obtained recognition of his right to protection in addition to what his First Patent afforded, he then filed application for the yeast activation process.

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[1]304 U. S. 167: "It is clear that, in the absence of intervening adverse rights, the decision in *Webster Co.* v. *Splitdorf Co.* does not mean that an excuse must be shown for a lapse of more than two years in presenting the divisional application."

[2]Besides the application for the separation species he filed three other divisional applications, one on activation of cereals, one on activation of milk, and one one activation of solid fats (R. 1718).

No intervening rights having arisen, we submit that, upon authority of *Overland* v. *Packard* and *Crown Cork & Seal* v. *Gutman*, no laches or estoppel can properly be imputed to Steenbock. In the latter case this Court distinguished the cases cited by the Court of Appeals (*Webster Electric Co.* v. *Splitdorf*, 264 U. S. 463 and *Wirebounds Patents Co.* v. *Saranac Automatic Machine Co.*, 65 F. (2d) 904) and they are distinguishable similarly from the instant case.

CONCLUSION.

It is thought that the petition for the writ of certiorari is well grounded and that it should be granted.

Respectfully submitted,

George I. Haight,
Frank Parker Davis,
Attorneys for Petitioner.

Ward Ross,
Of Counsel.